KLICKITAT CREEK BRIDGE
Mount Rainier National Park
Spanning Klickitat Creek on Yakima Park Highway
Longmire Vicinity
Pierce County
Washington

HAER No. WA-50

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
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KLICKITAT CREEK BRIDGE
Mount Rainer National Park
HAER WA-50

I. INTRODUCTION

Location:	Spanning Klickitat Creek on Yakima Park Highway, one mile east of White River Ranger Station, Mount Rainier National Park, Pierce County, Washington. Quad: White River Park, Wash. UTM: 10/610700/5195400
Date of Construction:	1930
Structure type:	Stone-faced reinforced concrete filled spandrel arch bridge
FHwA Structure No.:	N/A
Designer:	Western Regional Office, Bureau of Public Roads, San Francisco, California
Contractor:	J. F. Ward, Inc., Seattle, Washington
Owner:	Mount Rainier National Park, National Park Service
Use:	Park highway bridge
Significance:	The Klickitat Creek Bridge is representative of the National Park Service's "rustic style" of architecture through its use of a masonry veneer to conceal its reinforced concrete construction. Such attention to detail helps the structure harmonize with its surroundings.
Project Information:	Documentation of the Klickitat Creek Bridge is part of the Mount Rainier National Park Roads and Bridges Recording Project, conducted in summer 1992 by the Historic American Engineering Record. Richard H. Quin, Historian, 1992

II. HISTORY

This is one in a series of reports prepared for the Mount Rainier National Park Roads and Bridges Recording Project. HAER No. WA-35, MOUNT RAINIER NATIONAL PARK ROADS AND BRIDGES, contains an overview history of the park roads. In addition, HAER No. WA-126, YAKIMA PARK HIGHWAY, contains more specific information on the road on which the structure is located.

Yakima Park Highway

The Yakima Park Highway, built between 1927 and 1931, replaced the old White River Road to Glacier Basin built by mining interests in the 1910s, and continued up the northeast shoulder of Mount Rainier to the high subalpine meadows at Yakima Park (Sunrise). The road was surveyed and constructed under the supervision of the Bureau of Public Roads (BPR), which in 1925 assumed responsibility for major road projects in the national parks.

The 15.5-mile Yakima Park Highway leaves the Mather Memorial Parkway [HAER No. WA-35g] at the "White River Wye," five miles south of the northeast park entrance. The road runs southwest for four miles, crossing rustic style bridges at Dry (Deadwood) Creek [HAER No. WA-49] and Klickitat Creek and a plain steel girder and reinforced concrete replacement span over Shaw Creek. The road then makes a looping curve to cross the Fryingpan Creek Bridge [HAER No. WA-54] and swings northwest another mile to the White River crossing [HAER No. WA-53]. From this point, a graveled road provides access to the White River Campground and the Glacier Basin trail. The main road begins to climb a series of switchbacks to Sunrise Point, where it makes a final swing to the west to reach the Sunrise development at Yakima Park, the highest point (elev. 6,450') reached by the park road system.

Klickitat Creek Bridge

Klickitat Creek Bridge on the White River Road is a good example of the so-called "rustic style" of architecture employed by the National Park Service. The reinforced concrete spandrel arch bridge is faced in native stone and features large stone voussoirs, giving it the appearance of a masonry arch bridge. The structure spans Klickitat Creek, a perennial stream which rises on the west flank of the Cascade crest and flows generally northwest to a confluence with the White River. Construction of the bridge was part of the late 1920s realignment of the lower White River Road and its extension to Yakima Park (Sunrise).

The bridge was designed at the San Francisco Regional Office of the Bureau of Public Roads (BPR), an agency of the U.S. Department of Agriculture. With the signing of a Memorandum of Agreement with the National Park Service in July 1925, the BPR assumed responsibility for major road and road reconstruction projects in all the national parks. Within a short time, the BPR was assigned to survey and build the new Yakima Park Highway in Mount Rainier National Park. The final location survey for the road was conducted by BPR Associate Highway Engineer C. R. Short in 1925. Short determined the site for the required bridge across Klickitat Creek, and in his report suggested that the crossing might be a good location for a park campground. "Klickitat Creek is a very beautiful stream and has many large trees along the banks, and a small camping area might be developed within the park," he suggested, but admitted that Mount Rainier would not be visible from the camp.[1]

Plans for the Klickitat Creek Bridge were produced at the BPR Western Regional Office in San Francisco in September 1929. Accompanying architectural plans showing details of the masonry work were prepared by the Landscape Engineering Division of the National Park Service in January 1930.[2] Bids for the

construction of the bridge were opened at the office of the District Engineer of the Bureau of Public Roads in Portland, Oregon on 27 May 1930. The BPR recommended the acceptance of the submission of J. F. Ward, Inc., of Seattle, on the basis of its low bid of $28,615. (The engineer's estimate for the cost of construction was $33,550.) The contract was awarded to Ward on 22 July. By the end of the month, the contractor had completed 15 percent of the work on the project.[3]

Contractor Ward ran into financial difficulties in August and the financing had to be assumed by his bondsman. Mr. Ward continued to supervise the work. Progress was good and by the end of the month Park Superintendent O. A. Tomlinson reported that the project was 22 percent complete. The Klickitat Creek Bridge was completed in October 1930 and accepted by the National Park Service on 18 November.[4] The Yakima Park Highway was completed the following year and opened to public travel on 15 July 1931.

Description

Like a number of other bridges in Mount Rainier National Park, Klickitat Creek Bridge is a reinforced concrete spandrel arch bridge with masonry voussoirs and spandrel walls. The 126' bridge spans Klickitat Creek on a single semi-elliptical arch with a clear span of 80' and rising 17' 3" from the spring line. The bridge is 31' 4" wide, and carries a 24' roadway and a single 4' sidewalk on the south or upstream side. The bridge is constructed on a 15° skew from southeast to northwest. Although the structure is built on a tangent, the roadway crosses on an almost imperceptible 1° curve. The span is located on a slight 0.6 percent grade rising from the west and is superelevated 6" to the north over the 24' roadway.

The bridge is a reinforced concrete barrel arch structure resting on concrete abutments. The large stone voussoirs, some more than 7' in height and capped with prominent keystones, were erected first. Masonry spandrel walls were built on top and the concrete was then poured behind them. This allowed the stone masonry to act as forms for the outer surfaces of the structure. The stones are further bonded to the concrete by hooked 3/4" diameter steel cramps 1' 8" long. Reinforcing steel used for the main concrete work consists of 1" top and bottom longitudinal steel bars on 12" centers and 1/2" diameter transverse bars on 2' centers. The top of the arch barrel and the inside surfaces of the spandrel and wing walls were lined with a membrane waterproofing before the concrete was poured. The following pouring schedule was observed: (1) the abutments were poured, followed by (2) the crown of the arch, (3) the haunches, and (4), construction keys between the crown and the haunches. In a second phase, more concrete was poured in stepped sections (5) over the lower haunches, (6) over the crown and keys, and (7), over the upper section of the haunches. Specifications for the structure dictated that the concrete be allowed to cure at least three days between pours. Following the main concrete work, the stone wing walls were constructed and the compacted earth fill was placed. The stone guard walls were then constructed, a 6" asphalt wearing surface was applied, and the sidewalk was constructed. Final work consisted of construction of hand-laid rock embankments at the base of the structure on the east end and site cleanup.[5]

Specifications indicate the bridge was designed to carry a dead load (snow load) of 150 pounds per cubic foot and a live load of 45 pounds per cubic foot with an allowance for impact of 2,100 pounds per foot for the width of the bridge. The arch barrel and spandrel walls were poured from Class "A" concrete (1:2:4 mix) and the arch footings from Class "B" concrete (1:2 1/2:5 mix). The following estimates of quantities were made, although adjustments probably had to made in the field during construction:

Class "A" concrete	215 cu. yds.
Class "C" concrete	115 cu. yds.
Reinforcing steel	32,000 lbs.
Arch ring masonry	115 sq. yds.
Cement rubble masonry	540 cu. yds.
Structural excavation	540 cu. yds.
Curb stones	135 lin. ft.
Membrane waterproofing	300 sq.yds.[6]

III. ENONOTES

1. C. R. Short, Associate Highway Engineer, Bureau of Public Roads, "Location Survey Report (1932) on Yakima Park Highway, Route No. 3, Mt. Rainier National Park, State of Washington" (Portland, OR: Bureau of Public Roads, 1932), 2.

2. U.S. Department of Agriculture, Bureau of Public Roads, "Klickitat Creek Bridge, White River Road, Rainier National Park Project 3-A-2," construction drawings RG 170 A&B, 2 sheets, September 1929; U.S. Oepartment of the Interior, National Park Service, Division of Landscape Architecture, "Architectural Plans, Klickitat Creek Bridge, Mt. Rainier National Park," construction drawings PG 170 A,B & C, 3 sheets, January 1930.

3. O. A. Tomlinson, Superintendent, Mount Rainier National Park, Superintendent's Monthly Report, May 1930, 6; Superintendent's Monthly Report, June 1930, 7; Superintendent's Monthly Report, July 1930, 12. MORA Archives, Box H2621, Superintendents' Annual Reports 1926-1932 file; Jos. M. Dixon, First Assistant Secretary of the Interior, to the Secretary of the Interior, 22 July 1930. National Archives and Records Administration, Record Group 48, Box 1991, File 12/7, Mount Rainier National Park contracts.

4. Tomlinson, Superintendent's Annual Report, 1930, 13. MORA Archives, Box H2621, Superintendents' Annual Reports 1926-1932 file; Superintendent's Monthly Report, October 1930, 6; Superintendent's Monthly Report, August 1930, 8. MORA Archives, Box H2615, Superintendents' Monthly Reports 1928-1931 file.

5. See BPR construction drawings RG 170 A & B.

6. See the schedule on BPR construction drawing RG 170 A.

IV. BIBLIOGRAPHY

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Short, C. R., Associate Highway Engineer, Bureau of Public Roads. "Location Survey Report (1932) on Yakima Park Highway, Route No. 3, Mt. Rainier National Park, State of Washington." Portland, OR: Bureau of Public Roads, 1932.

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--Superintendent's Monthly Report, October 1930. MORA Archives, Box H2615, Superintendents' Monthly Reports 1928-1931 file.

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U.S. Department of the Interior, National Park Service, Division of Landscape Architecture. "Architectural Plans, Klickitat Creek Bridge, Mt. Rainier National Park." Construction drawings PG 170 A,B & C, 3 sheets. San Francisco, CA: National Park Service, Division of Landscape Architecture, January 1930.

--"Scheme #2, Preliminary Drawing, Klickitat Creek Bridge, Mt. Rainier National Park." Construction drawing R920. San Francisco, CA: National Park Service, Division of Landscape Architecture, 7 January 1939. Engineering Division files, Mount Rainier National Park.

ADDENDUM TO
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